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(54) Abstract Title
Rucksack

(57) In a rucksack designed specifically to alleviate lower back strain in school children, the support surface 5 and the base 6 of the rucksack are integrally formed to be self-supporting and the juncture between them consists of a section 7 with a radiused curvature. The support surface is preferably made of a strong polyester material 10 overlying an integral compressed foam material 11. The foam material is compressed less in some areas so as to form padded zones 8 for comfort and ventilation and which act as load spreading areas. The shoulder straps 4 are positioned just above the curved juncture to aid comfort and encourage proper wearing.

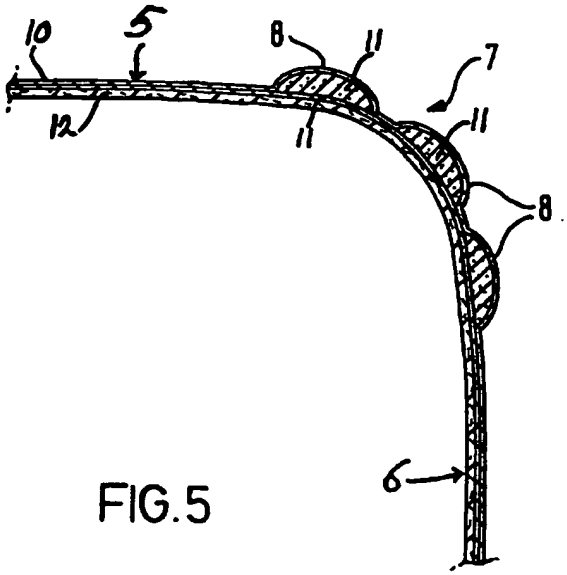

FIG.5

GB 2 338 890 A

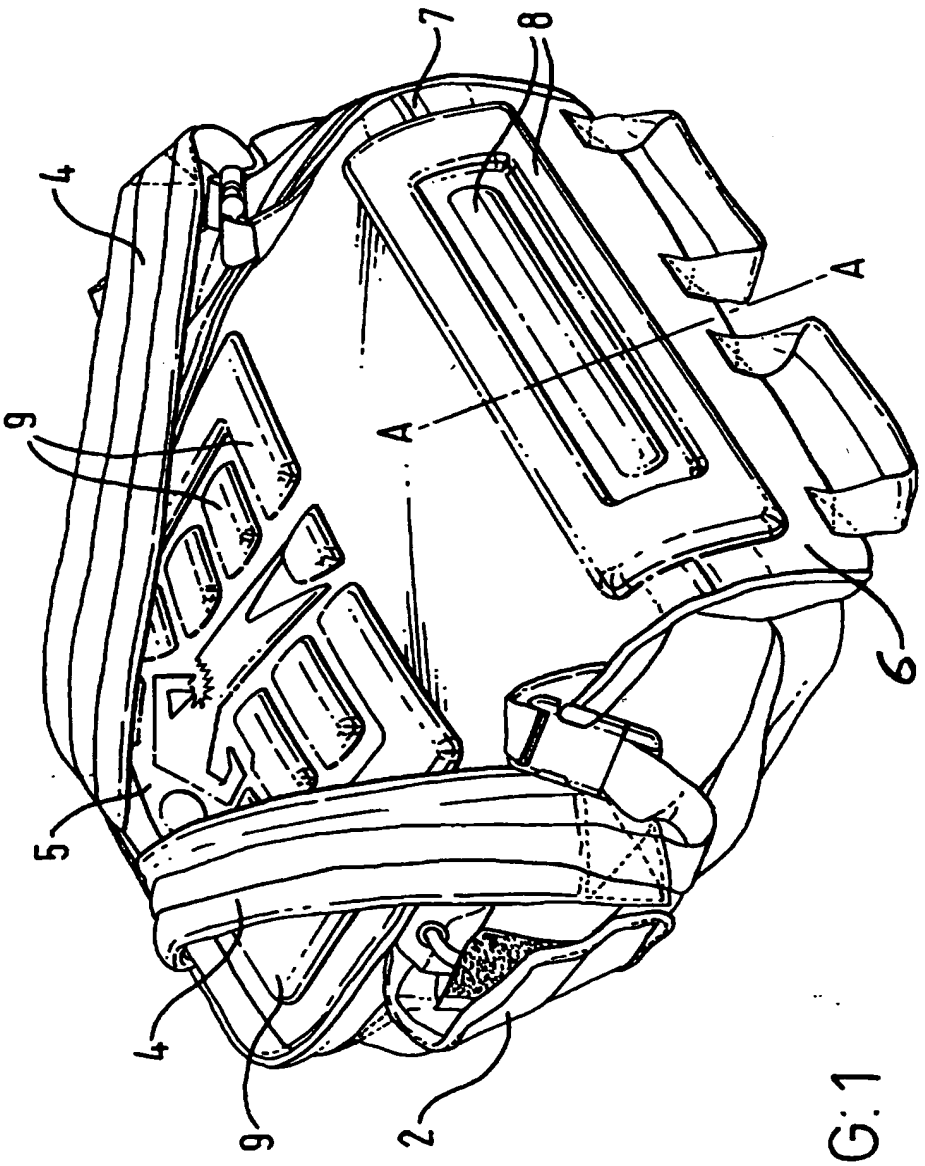

FIG. 1

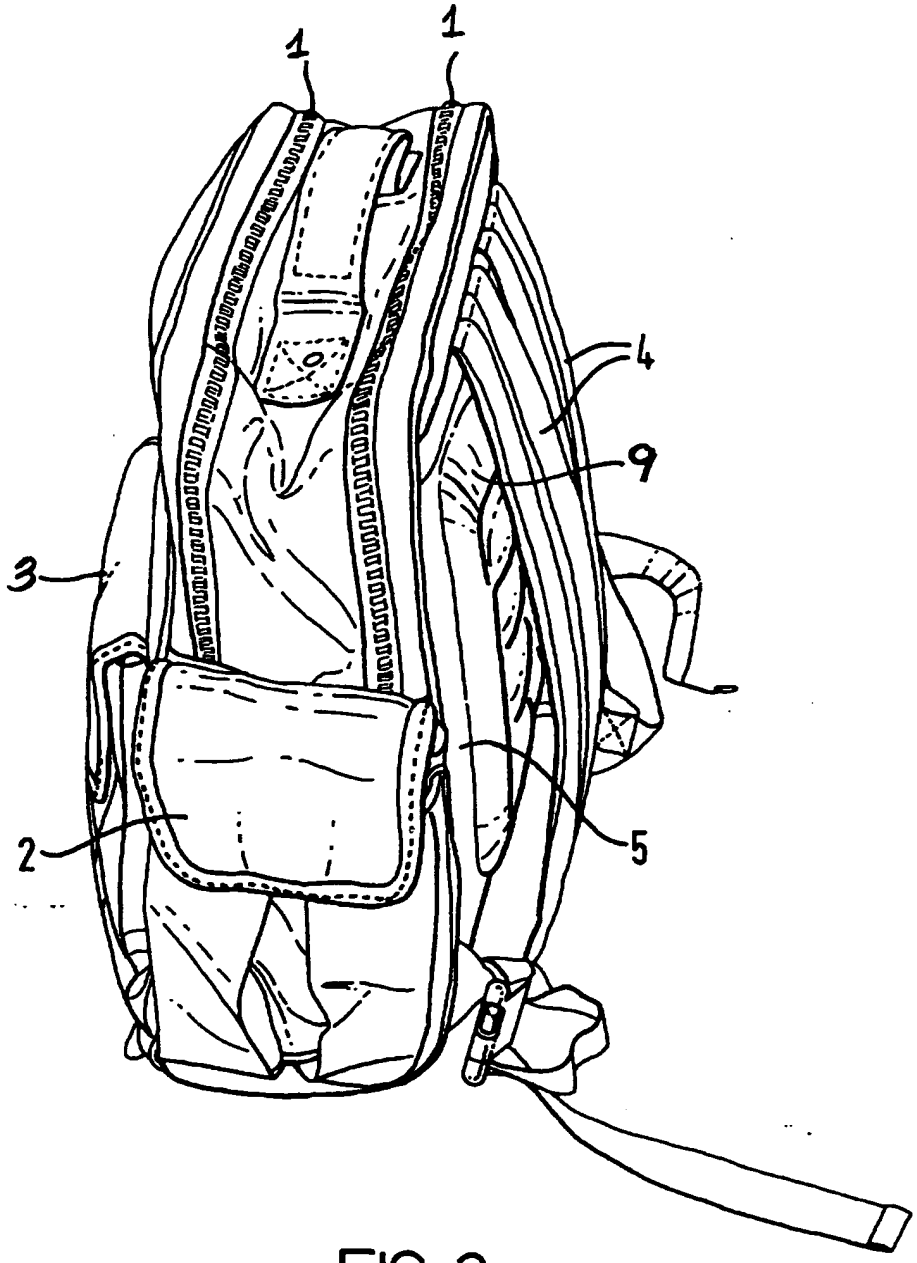

FIG. 2

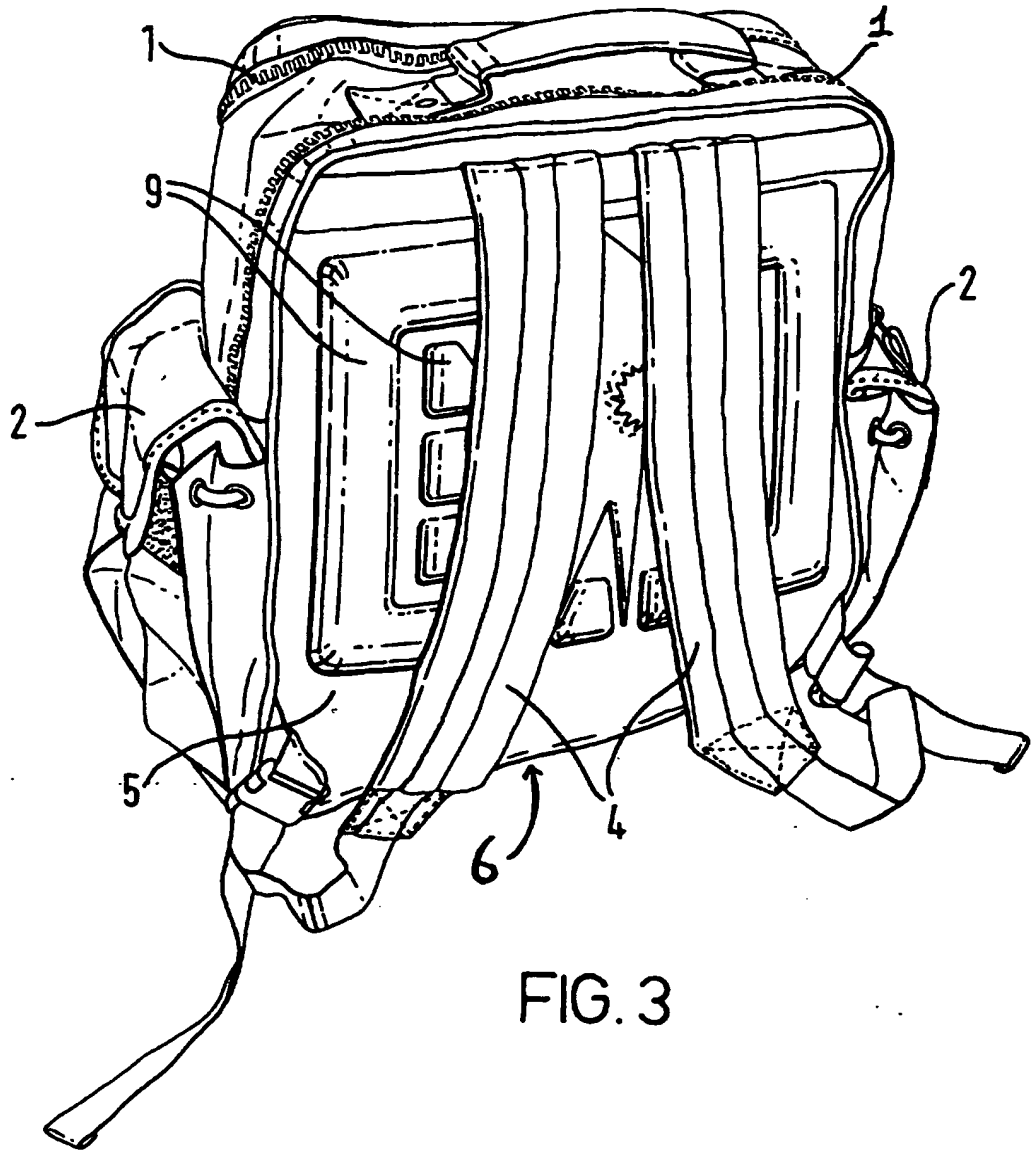

FIG. 3

FIG. 4

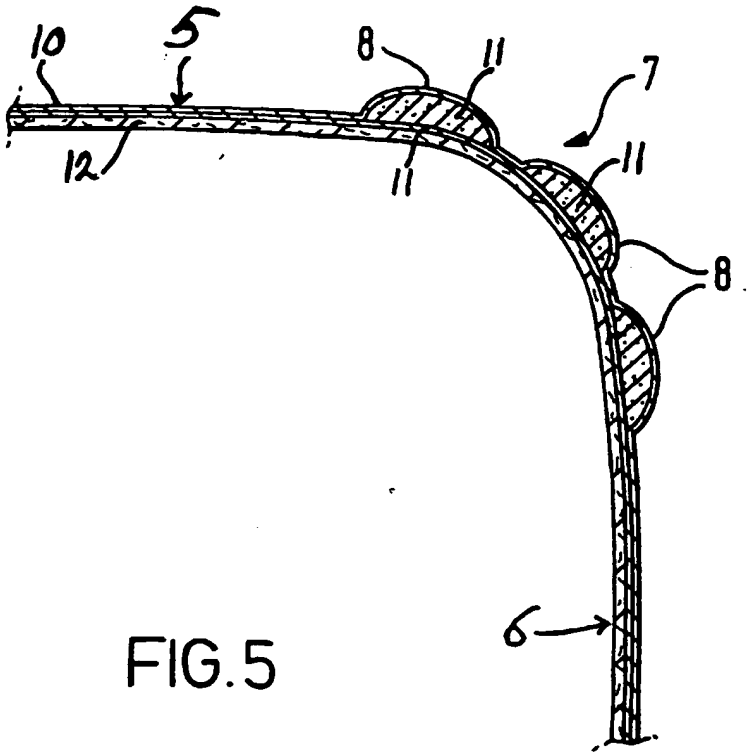

FIG.5

TITLE:

Improved Backpack

This invention relates to an improved backpack also known as a rucksack being primarily a device for the carriage of items on the person and worn on the back where such a device is retained by two straps passing over respective shoulders with a surface of the device bearing against the back of a user.

There is increasing concern over the way in which such backpacks bear against the back and the shoulders and this may cause lasting damage particularly to children. The load carried in the backpack, particularly school books, can be considerable and undue strain is often applied to vulnerable areas of the back and shoulders this being especially true when the backpack is heavily loaded causing distortion. In one case an eleven year old suffering from severe leg and knee pain was diagnosed as having spinal nerve root compression due to excess weight being carried on the shoulders and back.

One of the objects of this invention is to provide an improved construction of backpack which supports loads without undue distortion and which distributes the loads on the shoulders and back of a wearer in a more comfortable and beneficial manner particularly when heavily loaded.

A further object is to provide a backpack, primarily for children, which is comfortable to wear and which encourages good posture as well as being easy and pleasurable to use.

Yet a further object is to provide a backpack which discourages the carrying of heavy loads by making overloading difficult.

According to this invention there is provided a backpack of the kind comprising a bag with straps forming loops one end of each being attached to an upper side of the bag to pass over a respective shoulder of a wearer and the other end being attached to a lower part of the bag on opposed sides thereof with a support surface of the bag being adapted to bear against the back of a wearer, the backpack being characterised by the support surface being coextensive with a base of the bag, and preferably formed in one piece, the juncture between the support surface and the base being radiused and the combination of the support surface and the base being self supporting.

Preferably the support surface and the base are integral with the juncture being pre-formed with the radiused curvature. The support surface may incorporate a reinforcing material which may be in the form of elongate ribbing. In one construction the ribbing is formed by a dense plastics foam material forming padding which is firm and self-supporting yet resilient and flexible.

The principle feature of this invention is a backpack incorporating a semi-rigid padded back face with ventilation ribs and the curved lower part which is appropriately sized and curved to fit over the entire thoracic section of the spine between the T1 and the L1 vertebrae creating a cushion between the contents and the back of the wearer.

One embodiment according to this invention is shown by way of an example only and described in conjunction with the accompanying drawings.

In the drawings:

Fig 1 shows a perspective view of a backpack viewed from the back and looking from below at the base and support surface,

Fig 2 shows a perspective view from one side,

Fig 3 shows a view looking at the back support surface from above,

Fig 4 shows a view from the front, and

Fig 5 is a scrap section on A-A of Fig 1 showing the juncture between the support surface and the base.

Referring to the drawings there is shown a backpack or rucksack formed from a strong flexible material with top opening slide fasteners 1 and a number of side pockets 2 and front pockets 3. Various attachments, such as webbing straps, may be provided for securing articles. The rear of the backpack, that is the surface normally worn adjacent the back of a wearer, has shoulder straps 4 these being positioned as shown and provided with adjustment. The straps will preferably be wide and padded. The straps 4 are positioned on the top side towards the mid-point and this assists in comfort and improved distribution of the weight as well as encouraging proper wearing. The other end of each strap is positioned at a side just above the start of a curved juncture 7.

A feature, according to this invention, is the configuration and construction of the back and the base comprising a support structure which is more rigid than the material of the bag and, to a large extent, self supporting. A further feature is that this back covers the side seams around the perimeter of the bag and prevents discomfort.

As shown particularly in Figs 1 and 5 the support surface 5 and base 6 are in one piece and comprise a strong polyester material 10 on the outside overlaying an integral EVA foam material 11 forming a reinforcement 11 imparting rigidity with possibly a further liner 12 on the inside. The EVA 11 may be a foamed material which has been either highly compressed and connected with, or moulded with, the polyester 10 and the latter may be provided on each

side if required. The junction of the support surface and the base has a moulded-in radius 7.

The polyester 10 and EVA 11, in combination, are moulded and compressed so as to provide a number of ribs 8 around the junction 7 as well as ribs 9 on the support surface 5. These ribs have the nature of firm yet yielding pads.

Provided the shoulder straps are correctly adjusted the curved bottom 7 of the bag should then lie over the lumbar region and clear the major protuberances of the buttocks. The semi-rigid back then creates a cushion between the contents of the bag and the wearer.

The support surface of semi-rigid form is thus padded in discreet areas with the padding being hard and not too yielding. The purpose is to enable the support surface to more closely follow the natural spine shape of children and to ensure that when the shoulder straps 4 are properly adjusted the base of the bag will be above the buttocks but not applying localised pressure to the back or "digging-in". Because the support surface is flexible to some extent and due to the ribbing sufficient air circulation is provided to prevent excessive perspiration accumulation.

The strong yet flexible material used for the bag tends to prevent overloading as the construction does not permit overloading by expanding to any great extent.

The size and proportions are arranged to prevent unbalance and to avoid the bag protruding too far from the back avoiding spinal twist. The side pockets are arranged to prevent undue loading and thus asymmetrical loads. Typical dimension for the main bag and for children would be width 32 cm;

height 40 cm; depth 14 cm; curvature radius of junction area 7 about 8 cm.

The support surface 5 and base 6 can be produced by using an EVA material as a mould lining to which the polyester is applied with the assembly then being subject to heat and pressure in a mould to produce the ribbing 8 and 9. The shoulder straps 4 are connected with the support surface 5 and base 6 thus preventing sagging under load.

In the preferred construction shown in the drawings the ribs 8 are formed by a marginal ribbed area which is rectangular and extending across the width of the bag and surrounding a ribbed area extending cross-wise. This area being provided in the curved zone 7 as more clearly shown in Fig 5. The ribs 9 may similarly be configured as a rectangular border toward the upper part of the surface 5 and surrounding laterally extending ribs. A logo may be incorporated into the ribbing during the moulding process.

Claims

1. A backpack of the kind comprising a bag with straps forming loops one end of each being attached to an upper side of the bag to pass over a respective shoulder of a wearer and the other end being attached to a lower part of the bag on opposed sides thereof with a support surface of the bag being adapted to bear against the back of a wearer, the backpack being **characterised** by the support surface being coextensive with a base of the bag, the juncture zone between the support surface and the base being radiused and the combination of the support surface and the base being self supporting.

2. A backpack in accordance with Claim 1, **characterised** in that the support surface and the base are integral and incorporate a reinforcing material.

3. A backpack in accordance with Claim 1 or 2, **characterised** in that the support surface and/or the base and/or the juncture zone include raised padded zones, preferably in the form of ribbing.

4. A backpack in accordance with claim 3, **characterised** in that a laterally elongated raised padded zone is provided in the juncture zone and extending into the base, said padded zone following the curvature of the juncture zone.

5. A backpack in accordance with Claim 3 or 4, **characterised** in that the ribbing is formed from a dense plastics foam material forming padding being firm and self supporting yet resilient and flexible.

6. A backpack in accordance with any preceding Claim, **characterised** in that the support surface and the base are moulded or formed as one piece incorporating the radiused juncture zone.

7. A backpack in accordance with Claim 6, **characterised** in that the support surface and base are moulded using a dense foamed plastics material which is compressed over defined areas to leave partially compressed or uncompressed material in areas in the form of ribbing.

8. A backpack in accordance with Claim 7, **characterised** in that the support surface and base comprise a laminate formed from a woven outer layer material and the foamed plastics, optionally incorporating an inner or lining material layer, the laminate being subject to heat and pressure to form a composite moulded structure incorporating the curve of the juncture.

9. A backpack in accordance with any preceding claim, **characterised** in that the straps attach to the top of the bag at locations adjacent and each side of the centre, the attachment of each strap at the lower part of the bag being at a location on the side and above the curvature at the juncture.

10. A backpack constructed and arranged as described herein and exemplified with reference to and as shown in the drawings.

The Patent Office

8

INVESTOR IN PEOPLE

Application No: GB 9915093.0 **Examiner:** Damien J Huxley
Claims searched: 1 to 10 **Date of search:** 27 September 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): A4G

Int Cl (Ed.6): A45F: 3/04, 3/06, 3/08

Other: ONLINE: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	US 5361955 (GREGORY)	
A	WO 94/13172 A1 (PIGNA)	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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